

Digital competences in pedagogy, citizenship and professional development of the university professorship

Competencias digitales en pedagogía, ciudadanía y desarrollo profesional del profesorado universitario

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ABSTRACT

In today's digitized world, digital competences are required to facilitate the transition to the Internet. For professorship, these competences go beyond knowledge of a particular subject. They focus on the skills needed to transmit that knowledge to students. A quantitative approach study was applied. The design was non-experimental and descriptive. The population and sample correspond to the 70 teachers who worked in the Faculty of Humanistic and Social Sciences during the first semester of 2023. The instrument for data collection was a teaching self-assessment. The competencies in digital citizenship showed the highest levels of teacher mastery with a value of 5. The competencies in pedagogy and professional development showed a value of 4. 93% of UTM-CHS teachers stated they had participated in training activities on the use of ICT in education. In conclusion, university faculty in Ecuador must have a stronger digital academic background; they must establish better pedagogical and professional development skills, research capacity, knowledge of educational technologies, intercultural skills and leadership skills. To ensure a high-quality learning environment all three areas must be at the same level of outcomes. For that, university professional development leads to establishing good pedagogy. Then pedagogy is strengthened through digital citizenship.

Resumen

En el mundo digitalizado de hoy, se requieren competencias digitales para facilitar la transición a Internet. Para el profesorado, estas competencias van más allá del conocimiento de una materia concreta. Se centran en las habilidades necesarias para transmitir esos conocimientos a los alumnos. Se aplicó un estudio de enfoque cuantitativo. El diseño fue no experimental y descriptivo. La población muestra corresponde a los 70 docentes que laboraron en la Facultad de Ciencias Humanísticas y Sociales durante el primer semestre de 2023. El instrumento de recolección de datos fue la autoevaluación. Las competencias en ciudadanía digital mostraron los mayores niveles de dominio docente con un valor de 5. Las competencias en pedagogía y desarrollo profesional mostraron un valor de 4. El 93% de los docentes de la UTM-CHS declararon haber participado en actividades de capacitación sobre el uso de las TIC en la educación. En conclusión, el profesorado universitario en Ecuador debe tener una mayor formación académica digital; deben establecer mejores habilidades pedagógicas y de desarrollo profesional, capacidad de investigación, conocimiento de tecnologías educativas, habilidades interculturales y habilidades de liderazgo. Para garantizar un entorno de aprendizaje de alta calidad, las tres áreas deben estar al mismo nivel de resultados. Por eso, el desarrollo profesional universitario lleva a establecer una buena pedagogía. Después, la pedagogía se refuerza a través de la ciudadanía digital.



Keywords

Higher Education; Leadership; competences; research management; University



Palabras clave

Educación superior; liderazgo; competencias; gestión de la investigación; universidad

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INTRODUCTION

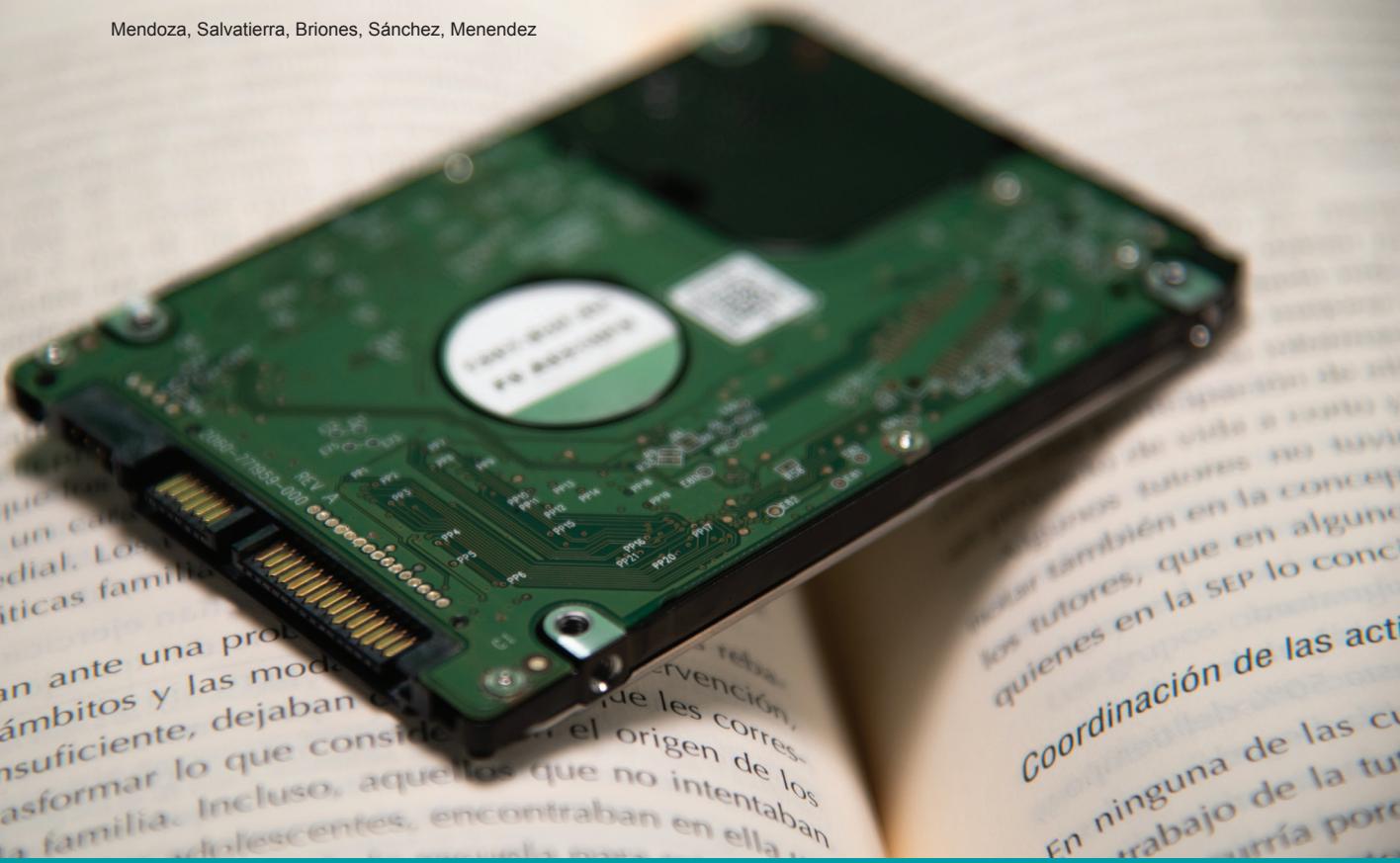
In today's digitized world, skills are required to facilitate the transition to the Internet. These skills are known as digital competences. Competences are a set of knowledge, values and attitudes that are needed to effectively perform their activities. For teachers, these competences go beyond knowledge of a particular subject and focus on the skills needed to transmit that knowledge to students. Teaching competences include skills in areas such as communication, lesson planning, classroom management, assessment design, use of educational technologies, conflict management and the ability to work with a wide range of students with different needs and abilities (Cejas *et al.*, 2019).

It is important for teachers to have up-to-date and relevant competences, as education is constantly changing and evolving. Continuous training and professional development are essential to maintain and improve teaching competences.

Teaching competences are important for student success. A good teacher can motivate and guide students to reach their full potential (Expósito-Langa *et al.*, 2016). Therefore, the identification, development and assessment of teaching competences are inseparable for the training and evaluation of teachers in any education system.

Competences are included to help teachers teach effectively. Understanding the needs of students, they provide appropriate support and guidance in professional development. Teaching competences may vary according to the level of education and area of specialization. Some teaching competences include the ability to plan, design effective lessons, ability to communicate clearly and concisely, ability to assess student learning, ability to use technology to support the teaching and learning process (Rodríguez *et al.*, 2021).

It is also important for teachers to be able to create a positive learning environment, foster students' social-emotional development and work as



a team with other education professionals and parents. Teaching competencies are paramount to ensure quality education and meet the needs of students in today's world. Teachers must keep up-to-date and continue to develop their skills and knowledge to improve their teaching practice and achieve better learning outcomes for their students (Rodríguez *et al.*, 2021).

The role of university faculty is important in the development of quality higher education. In Ecuador, higher education is regulated by the Organic Law of Higher Education (LOES), which establishes the competences that university teachers must possess to guarantee academic excellence and the comprehensive education of students (Cejas *et al.*, 2019).

University teaching functions in Ecuadorian higher education focus on the development of students' skills and competences. In Ecuador, pro-

fessors are expected to have a solid academic and professional background, as well as pedagogical and social skills to interact with students and foster their learning (Koyuncuoglu, 2022). In this article, the competences expected of university teachers in Ecuador will be explored. However, the theoretical sources underpinning the competencies and tools needed to purchase them must be investigated.

LITERATURE REVIEW

The role of the university teacher

The role of the university teacher is important and complex, as it involves not only imparting knowledge to students, but also guiding and motivating their learning, fostering their personal and professional development, and contributing

to the formation of responsible citizens committed to society (Mendoza *et al.*, 2022).

The main functions of the university teacher include:

- **Teaching:** The university teacher impart knowledge and skills in his or her area of specialization, using appropriate didactic methods to achieve meaningful and lasting learning in his or her students.
- **Research:** University teachers also have the task of conducting research in their area of specialization to keep up to date and contribute to the advancement of knowledge.
- **Academic guidance:** University teachers must guide students in their academic progress, advising them in their choice of subjects, in the preparation of assignments and projects, and in career planning.
- **Mentoring:** The university teacher can play a key role in mentoring students, supporting them in their personal and professional development, in problem solving, and in monitoring their academic progress.
- **Participation in committees and governing bodies:** University teachers also participate in university committees and governing bodies, where important decisions are made for the institution and policies are established that affect the academic development and welfare of students.

Competences

According to Cejas *et al.* (2022) the competences of university teaching staff in Ecuador are divided into three main areas: professional competences, pedagogical competences and research competences. These competences are classified as follows:

- Professional competencies
- Finally effective communication
- Pedagogical competences

- Effective teaching
- Research competences

The role of the university lecturer in the teaching-learning process takes the form of the following competences (Mertala, 2021):

- **Facilitating learning:** The university teacher must be able to create a learning environment in which students feel comfortable and motivated to learn. They must be able to adapt their teaching style to the needs of the students and make learning accessible to all.
- **Designing and delivering courses:** The university teacher is responsible for designing and delivering courses that are up-to-date, relevant and in line with the objectives of the program of study. He/she must ensure that content is clear, structured and appropriately presented.
- **Evaluation:** The university lecturer should regularly assess students' progress and provide constructive feedback that helps students to improve their academic performance. He/she should be fair, objective and transparent in his/her evaluation process.
- **Research:** The university teacher must also be involved in academic research and be able to share his or her knowledge with students. He/she should keep up to date in his/her field of study and can contribute to knowledge and innovation in his/her area of specialization.
- **Guidance:** The university lecturer should serve as a guide and mentor for students, providing support and guidance in their academic and career path. They should be available to provide academic and personal counselling to students.

The role of the university teacher involves not only transmitting knowledge, but also guiding and motivating students' learning. To foster their personal and professional development to contribute

to the development of a fairer and more equitable society. The role of the university lecturer is central to the learning and development process of students in higher education. They not only impart knowledge, but also act as role models and mentors in the formation of future professionals and leaders (Blackledge, 2021).

Digital self-assessment tool for teachers

There are several digital self-assessment tools for teachers, some of which can be used free of charge online. According to Xie *et al.* (2021), here are some options:

- Moodle: This is learning management system that allows teachers to create online courses and conduct assessments for their students. Moodle has several self-assessment options for teachers such as quizzes, surveys and activities that allow students to assess their own learning.
- Google Forms: A free online forms and survey tool that allows teachers to create assessments for their students quickly and easily. Forms can include multiple choice, short answer, true or false, and other options.

Teachers can choose the tool that best suits their needs and teaching objectives. Digital assessment tools allow them to identify their own skills. They allow them to verify what they know and don't know about technology

- ProFuturo: The Teachers' Digital Self-diagnosis Competences is a free online tool that allows teachers to identify their level of digital competences through three axes: pedagogical practice, digital citizenship and professional development.
- Kahoot!: Is a learning games platform that allows teachers to create interactive quizzes for their students, that can be designed with multiple choice questions and the game is played in real time with the group of students.
- Edpuzzle: A platform that allows teachers to create interactive quizzes and personalized educational videos. Quizzes can be designed with multiple choice, true or false, and open-ended questions; the students receive immediate feedback.
- Mentimeter: A tool that allows teachers to create interactive presentations with questions and surveys in real time. Students can answer the questions from their mobile devices and the results are displayed in real time in the presentation.

Teachers can choose the tool that best suits their needs and teaching objectives. Digital assessment tools allow them to identify their own skills. They allow them to verify what they know and don't know about technology. They also make it easier to demonstrate how teachers can evolve in assessment (Mendoza *et al.*, 2021). In the Republic of Ecuador, the lack of digital competences of teachers is perceived through research and design of educational platforms (Martín *et al.*, 2021). The lack of digital competences of the teaching staff working at the Technical University of Manabí, Faculty of Humanistic and Social Sciences (UTM-CHS) is a problem that can have serious consequences for students and society in general. In the digital age in which we live, it is important that teachers have solid skills and knowledge in the use of digital tools and technologies.

These competences make it easier for them to succeed in the labour market and in their daily

lives. Among the possible causes of this lack of digital competences in Ecuadorian university education is the lack of resources. On the other hand, the lack of adequate training for teachers. There is also the lack of inclusion of digital skills in the curricula. If these skills are not properly assessed, teachers can Educate or create professionals with deficiencies.

University teachers are often not adequately trained in the use of digital tools. Misuse of technology by faculty prevents them from guiding students on how to use them effectively (Navarro *et al.*, 2022). It is important that UTM-CHS recognizes the importance of digital competence and takes steps to ensure that faculty have the necessary skills and knowledge to be successful in education.

Based on the above, the following questions arise:

- What is the appropriate digital tool to assess the teaching competences of Ecuadorian university teachers at the Technical University of Manabí?
- What are the digital competences possessed by the teaching staff of the Faculty of Humanistic and Social Sciences during semester A-2023?

To answer the questions posed, the following objectives are proposed:

- To apply the ProFuturo digital competences self-assessment questionnaire for teachers.
- To describe the digital competences most applied by teaching staff at the Technical University of Manabí.

MATERIALS AND METHODS

Research approach

A quantitative approach was applied, considered by Cejas *et al.* (2021) as a research method based

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on the collection and analysis of numerical and statistical data. The quantitative method aims to test hypotheses and establish cause-effect relationships. In the quantitative approach, data are collected through surveys, questionnaires, tests, experiments and other techniques that generate numerical data. These data are analyzed using statistical tools to identify patterns, trends and significant relationships between variables.

Research design

The design was non-experimental and descriptive. A non-experimental research design is one in which the researcher does not deliberately manipulate an independent variable or randomly assign participants to different groups (Pinós *et al.*, 2023). Instead, the researcher collects data by observing and measuring variables as they occur naturally in the setting or situation under investigation. Descriptive research is used to describe the characteristics of a particular population or phenomenon, without manipulating any variables.

Population and sample

In research, population refers to the total set of individuals, objects, events or any other element that shares a common characteristic and is

relevant to the study in question. The population can be defined in many ways, depending on the purpose of the research and the context where it is conducted (Gündüz, 2020). At the Universidad Técnica de Manabí there are 8 faculties. The teachers in each faculty have different competences. The population corresponds to the 70 teachers of the Faculty of Humanistic and Social Sciences.

On the other hand, the sample is a representative selection of the population that is chosen to be studied in detail. In other words, it is a subset of the population used to make inferences about the entire population. The sample must be chosen to be representative of the population and the results obtained can be generalized with some confidence. Participatory non-probability sampling was applied. It is defined as a sample selection technique used in participatory research. This type of sampling focuses on the inclusion of the population's opinion and perspective in the process of selecting study participants (Navarro *et al.*, 2022). The sample was a total participatory sample. All teachers from the faculty of Humanities and Social Sciences participated. Therefore; the sample was 70 teachers.

Data collection instrument

For the data collection process, a digital questionnaire was applied. The questionnaire is

defined as a Teacher Self-Assessment Tool adapted from a tool developed by the Brazilian Centre for Innovation in Education (CBIE, 2023). The CBIE ProFuturo questionnaire is composed of 23 questions organized into three areas: pedagogical, digital citizenship and professional development. At the same time, each area is assessed based on four skills (12 skills in total).

The questionnaire has 5 answer options for each question. Option 5 corresponds to the frequency Always. Option 4 corresponds to Almost always. Option 3 is Sometimes. Option 2 is almost never and option 1 is never (Cejas *et al.*, 2021). After completing the self-assessment questionnaire, the teacher receives a report on the results. The report indicates to which level the competence area belongs. Level 1 is the lowest level called "Exposure". Level 2 is considered "Familiarization". Level 3 is "Adaptation". Level 4 is categorized as "Integration". Finally, the highest level is "Transformation". The report of results also offers orientations and guidelines to encourage their professional development, with the aim of giving them more autonomy in the search for the improvement of their practices and to accompany their progress over time. There are 12 competencies assessed, divided into 3 areas: Pedagogy, Digital Citizenship and Professional Development (see table 1, 2, 3).

Table 1. Digital competences self-assessment questionnaire for teachers to assess the pedagogy area

UNIVERSIDAD TÉCNICA DE MANABÍ (UTM)	RESEARCH	DATE ____ / ____ / ____				
Pedagogical practice	Be able to incorporate technology into students' learning experiences and educational strategies	Options				
		1	2	3	4	5
1) To what extent do I incorporate digital technologies into my pedagogical practices?						
2) How do I incorporate digital technologies into my pedagogical practices?						
Evaluation	Be able to use digital technologies to monitor and guide the learning process and evaluate student performance	1	2	3	4	5
3) To what extent do I use digital technologies to assess my students?						

UNIVERSIDAD TÉCNICA DE MANABÍ (UTM)	RESEARCH	DATE ____ / ____ / ____				
4) How do I use technological resources to evaluate and monitor the performance of my students?						
5) How do digital technologies help me guide my students' learning process?						
Customization	Be able to use technology to create learning experiences that meet the needs of each student	1	2	3	4	5
6) How do I use digital technologies to identify the pedagogical needs of my students?						
7) How do I use digital technologies to personalize my students' learning process?						
Innovation and creation	Be able to select and create digital resources that contribute to the teaching and learning process and classroom management	1	2	3	4	5
8) How do I select and evaluate the digital resources I use in my teaching practices?						
9) How do I use my knowledge to create digital content and resources?						
10) How do I help my students select digital content and resources?						
11) To what extent do I work with my students to create digital content and resources?						

Source: CBIE (2023).

Table 2. Digital competences self-assessment questionnaire for teachers to assess the Digital Citizenship Area

UNIVERSIDAD TÉCNICA DE MANABÍ (UTM)	RESEARCH	DATE ____ / ____ / ____				
Responsible use	Be able to make and promote the ethical and responsible use of technology (cyberbullying, privacy, digital presence and legal implications)	Options				
		1	2	3	4	5
12) How do I use my knowledge about the responsible and ethical use of digital technologies?						
13) How do I encourage the responsible use of digital technologies among my students?						
Safe use	Be able to make and promote the safe use of technologies (data protection strategies and tools)	1	2	3	4	5
14) How do I use my knowledge to ensure the security of my data when using digital technologies?						
15) To what extent do I promote the safe use of digital technologies in my pedagogical practices?						
Critical use	Be able to perform and promote a critical interpretation of the information available in digital media	1	2	3	4	5
16) How do I promote the critical use of digital technologies among my students?						
Inclusion	Be able to use technological resources to promote inclusion and educational equity	1	2	3	4	5
17) To what extent do I use digital technologies to promote inclusion and equity in education?						

Source: CBIE (2023).

Table 3. Digital competences self-assessment questionnaire for teachers to assess the professional development area

UNIVERSIDAD TÉCNICA DE MANABÍ (UTM)	RESEARCH	DATE _/_/_				
Self-development	Be able to use digital technologies in continuing education and professional development activities	Options				
		1	2	3	4	5
18) To what extent do I use digital technologies to support my professional development?						
Self-evaluation	Be able to use digital technologies to evaluate teaching practice and implement improvement actions	1	2	3	4	5
19) How do I use digital technologies to evaluate and improve my teaching practice?						
Share	Be able to use technology to participate in learning communities and peer exchanges and promote the participation of other teachers	1	2	3	4	5
20) How do I use digital technologies to participate in learning communities?						
21) How can I use digital technologies to share my knowledge?						
Communication	Be able to use technologies to maintain active, systematic and effective communication with the actors of the educational community	1	2	3	4	5
22) How do I use digital technologies to communicate with actors in the educational community?						

Source: CBIE (2023).

Completing this questionnaire takes between 30 and 40 minutes. If you do not have this time in a single login, you can save your answers and come back later. In total, there are 23 objective questions. You only *must* answer one alternative per question.

Validity and reliability of the results

A pilot study was carried out with 20 participants to examine the validity and reliability of the questionnaires. To determine content validity, the questionnaires were reviewed by a panel of three experts who evaluated the relevance of the items. Cronbach's alpha coefficient was then calculated for each questionnaire to assess their reliability. The pedagogy questionnaire obtained a Cronbach's alpha coefficient of 0.798, demonstrating good internal reliability. The digital citizenship questionnaire achieved a coefficient of 0.853, suggesting very good internal consistency amongst the items. Finally, the professional development questionnaire presented a statistical co-

efficient of 0.828, indicating respectable internal reliability (Mendoza *et al.*, 2021).

Overall, the high Cronbach's alpha coefficients for the three questionnaires, along with the content validity established by experts, demonstrate that they are valid and reliable instruments for measuring the constructs of interest in future studies with larger samples. The initial results are promising and support the continued use of these questionnaires.

Analysis technique

The self-assessment results were expressed in a report showing the teaching profile in five levels of development for each area and each competence. For level 1 called "Exposure", it is where it is shown that technologies are not used in educational practices. This is when the teacher requires support from someone to use them. It is also shown when their use is only personal. The teacher identifies technologies as a tool, not as part of the digital culture (CBIE, 2023).

If the results are at level 2 “Familiarization”, this is when the teacher begins to know and use technology in his or her activities in a timely manner. They identify and see technology as a support for their teaching work. The use of technology is centered on the teacher. Level 3 “Adaptation” is when technology is used on a regular basis. The use of ICT can be integrated into the planning of teaching activities. The teacher identifies technology as a complementary resource. Technology facilitates and improves teaching and learning processes (CBIE, 2023).

Regarding level 4 called “Integration”, the use of technology is frequent in the planning of activities. It is also developed in the interaction with students. The teacher works with technology in an integrated and contextualized way in the teaching and learning processes. Finally, for the highest level 5 outcome “Transformation”, it occurs when the teacher uses technology in innovative ways (CBIE, 2023). They share it with colleagues and carry out collaborative projects beyond the institution. They demonstrate their expertise in the use of digital technology. They consider technology as a tool for social transformation.

The results were then analyzed with SPSS (Statistical Package for Social Sciences) software. The software is a data analysis tool used in social and market research (Rodríguez *et al.*, 2021). It is also applied in other disciplines that require advanced statistical analysis. SPSS is produced by IBM and provides a working environment for data entry, data management and statistical analysis. For the analysis of the results, a descriptive statistical analysis was performed. Defined as a technique used to summarize and present data in an informative and useful way. Descriptive statistical analysis focuses on the description of the characteristics of a sample or population, through the calculation of measures of central tendency, measures of dispersion and the graphical representation of the data (Rodríguez *et al.*, 2021). The results are presented in the following section.

ANALYSIS AND RESULTS

To meet the first objective of the study, the digital competences questionnaire recommended by CBIE (2023) was applied. The levels of development achieved by the 70 teachers are presented in detail below. Each of the areas is presented with their respective competences.

Results of the pedagogical area

Teachers in pedagogy scored 4.02, considering on average level 4 of integration (see figure 1). At this level, teachers incorporate technologies in their planning, using them in their teaching routine both for diagnosing students and for monitoring and evaluating learning outcomes (Gündüz, 2020). They can also create different didactic strategies, according to the needs of learners (Zhao *et al.*, 2021).

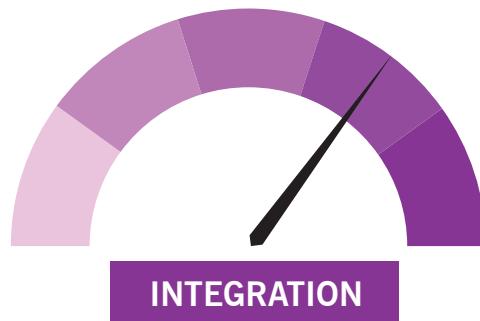


Figure 1. Graphical representation of the pedagogical area, with an average level of 4 (Integration).

Teachers can enhance or upgrade their skills by further expanding their knowledge of digital technologies beyond the classroom, both within their university and in dialogue with other institutions and by engaging in partnership and collaboration with other teachers, either face-to-face or in the virtual world (Basilotta *et al.*, 2022).

Competence of pedagogical practice: The use of technology must become a constant in

the teaching process. Teachers must see technology as an ally for students to develop collaborative work competences. Collaboration has become a fundamental tool in today's world. You need to innovate educational practices to equip your students with the tools to face the challenges of the future (Cabero-Almenara *et al.*, 2021).

Improving digital pedagogical practice competence requires:

- Start with an action, for example: Use Moodle, Train teachers, Offer training courses.
- The impact of the Moodle digital platform on the university educational process.
- The importance of training teachers in the development of digital competences and skills to improve their digital pedagogical practices.
- A training course called "Digital Teachers" that provides tools for digital pedagogical practice.
- Planning the use of different digital pedagogical practices and the importance of reflective practice.
- The role of power dynamics in the university space in shaping pedagogical practices.

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- The effects of digital performance on pedagogical practices.
- The use of digital games in education and pedagogical practices at the university.
- The integration of technology in pedagogical practice in virtual environments.
- Reflective practice and the development of digital competences for teaching.

Digital assessment competence: Technologies can further enhance the use of assessments in the process of monitoring and guiding your students' learning. Consideration should be given to promoting evaluative autonomy by stimulating the diagnosis and evaluation of their own learning and that of the other students in the classroom by trying to identify what they need to learn and how they can contribute to the group. The objectives of student assessment should be identified. Assessment is often only a tool for measuring memory. However, if used appropriately it can have a positive impact on educational performance (Vázquez *et al.*, 2021).

Competence personalization: According to the results personalization is a competence related to diagnosis and improvement. The use of digital tools can help to personalize students' learning experiences. This digital competence is necessary for teachers to effectively personalize students' learning. In addition, authors such as Levano *et al.* (2019) mention the importance of understanding personalization as a digital competence for teachers and learners. It seems that personalization is becoming increasingly important in education, and that the use of digital tools can help facilitate personalized learning experiences for university faculty (Vázquez *et al.*, 2021).

Selection and creation competence: According to the results, level 4 demonstrates that selection and creation are two fundamental skills in the digital world. The former involves finding relevant information, while the latter involves taking that information to develop something new or unique. These digital skills are becoming

increasingly important as students seek original and interesting content to study in university classes (Gökhan & Akoğlu, 2021).

On the one hand, level 4 is an indicator of having good search skills, meaning knowing where to find what a teacher needs and what tools to use to get accurate results. On the other hand, being able to create content means understanding not only how to gather data but also how to combine it in creative and innovative ways to produce something useful and attractive to the readers/end-users of the final product (e.g., posts on social media). Finally, both skills require in-depth knowledge of topics related to modern technology; therefore, it is important to constantly study up-to-date trends in the university education sector, as well as to remain open to learning new applicable methodologies (Pruneda *et al.*, 2023).

Results of the digital citizenship area

Teachers in pedagogy scored 4.91, considering on average level 5 called transformation (see figure 2). Level 5 means that teachers are digital citizens who constantly plan, develop and stimulate the exercise of digital citizenship among their students, colleagues and community (CBIE, 2023).



Figure 2. Graphical representation of the digital citizenship area, obtaining the average level of 5 (Transformation).

Safe use competence: The digital teacher competence of safe use of technology refers to

The digital teacher competence of safe use of technology refers to the ability of teachers to apply technology safely and responsibly in their educational practice; and this competence is considered useful for today's education

the ability of teachers to apply technology safely and responsibly in their educational practice. This competence is considered useful for today's education, as the use of technology in the classroom and beyond is becoming more common (Ramírez-Montoya & García-Peña, 2018).

Some skills that teachers with this competence possess include:

- Basic computer security knowledge: teachers should be familiar with concepts such as viruses, malware, phishing, spam and other types of online threats.
- Protection of personal data: Teachers should know how to protect the personal data of students and other members of the educational community. This includes the importance of using strong passwords and protecting confidential information.
- Safe use of social media: Teachers should know how to use social media safely and responsibly, both in their personal and professional use.
- Preventing cyberbullying: teachers should be trained to prevent and address cyberbullying online and offline, including the

According to the results, the teacher demonstrates knowledge of technological tools and resources, they are aware of the technological tools and resources available for use in the classroom and are up to date with technological advances

importance of teaching students to be good digital citizens.

- Evaluation of information sources: teachers should be able to evaluate the quality and reliability of online information and teach students to do the same.

Digital competence for safe use of technology in education: This competence involves being aware of the risks and opportunities involved in the use of technology in education, as well as the norms and standards that regulate its responsible and ethical use (Mon *et al.*, 2020). It also involves being able to teach students to use technology safely and responsibly, encouraging critical reflection on its use. Among the skills needed to develop this competence are knowledge of the most appropriate digital tools for each task, the ability to assess the quality and reliability of online information, knowledge of online security and privacy risks, and the ability to teach students to protect their personal information and respect copyright.

Digital competence in teaching for critical use of technology: Digital competence in teaching refers to the critical, creative and safe use of Information and Communication Technologies (ICT)

to achieve work-related, leisure and communication goals. Digital competence in teaching consists of five pillars: information, communication, content creation, security and technical problem solving (Martzoukou *et al.*, 2020). Teachers can use ICT to search for, evaluate and manage information; communicate with others through different digital media; create digital content; ensure online safety; and solve technical problems.

Among the digital teaching competences that favor the inclusion of technology in the classroom, according to Tourón *et al.* (2018), we can highlight the following: Digital teaching competence for technology inclusion.

According to the results, the teacher demonstrates the following: Knowledge of technological tools and resources. Teachers are aware of the technological tools and resources available for use in the classroom and are up to date with technological advances. This allows them to select the most appropriate tools and resources for each situation and make the most of their benefits.

Designing educational activities with technology. Teachers can design educational activities that integrate technology effectively. To do so, they consider the learning objectives, the characteristics of the students and the technological resources available.

Using technology for collaborative learning. Technology can be a very useful tool for fostering collaborative learning among students. Teachers are aware of the technological tools that facilitate this type of learning and can use them effectively.

Professional development outcomes

Teachers in pedagogy scored 3.92, considering on average level 4 of integration (see figure 3). This level suggests incorporating technology for self-development, not only recognizing it, but also enjoying the full potential of digital culture, both to evaluate and improve teaching practice and to share experiences and communicate with the educational community (CBIE, 2023).



Figure 3. Graphical representation of the professional development area, with an average level of 4 (Integration).

Self-development digital competence in teaching refers to teachers' ability to update and improve their digital skills. Level 4 implies that teachers are willing to learn and adapt to new technologies, as well as to develop their own digital competence. The purpose of self-development digital competence is to facilitate a pedagogical methodology in line with the needs arising from the new reality and to provide continuous professional development.

Self-assessment digital competence in teaching: Level 4 refers to the ability of teachers to assess their own level of digital competence and to identify areas for improvement. Self-assessment is an important process for developing teachers' digital competence as it enables teachers to identify their strengths and weaknesses in relation to the creative, critical and confident use of digital technologies. In addition, self-assessment can also help teachers to set clear goals for improving their digital competence and develop an action plan to achieve them. To carry out effective self-assessment, it is important that teachers have a clear understanding of what teaching digital competence entails and are willing to learn and adapt to new technologies (Sangrà *et al.*, 2023; UNESCO, 2021).

Teachers' digital competence in sharing: Teachers demonstrated level 4 of the digital teaching competence of sharing. This competence

refers to teachers' ability to generate and share digital content with their students and other teachers. This competence involves the creative use of digital technologies for the creation of content, as well as its dissemination through different networks and platforms (Vázquez *et al.*, 2021). In addition, this competence also focuses on collaboration between teachers and students, which enables the creation of knowledge and communication networks. To enhance this competence, it is important that teachers are willing to learn and adapt to new technologies, as well as to work in teams with other teachers. It is also important that teachers have a pedagogical methodology in line with the needs arising from the new reality and are committed to constructivist pedagogy.

Digital competence in communication: This competence involves the knowledge and technical ability to use digital communication tools such as email, social media, online communication platforms and video conferencing tools. According to the results, level 4 includes the ability to select and use the most appropriate means of communication for the message to be conveyed (CBIE, 2023). The teachers surveyed can communicate clearly and effectively with their students, encouraging

Digital competence in communication involves the knowledge and technical ability to use digital communication tools such as email, social media, online communication platforms and video conferencing tools

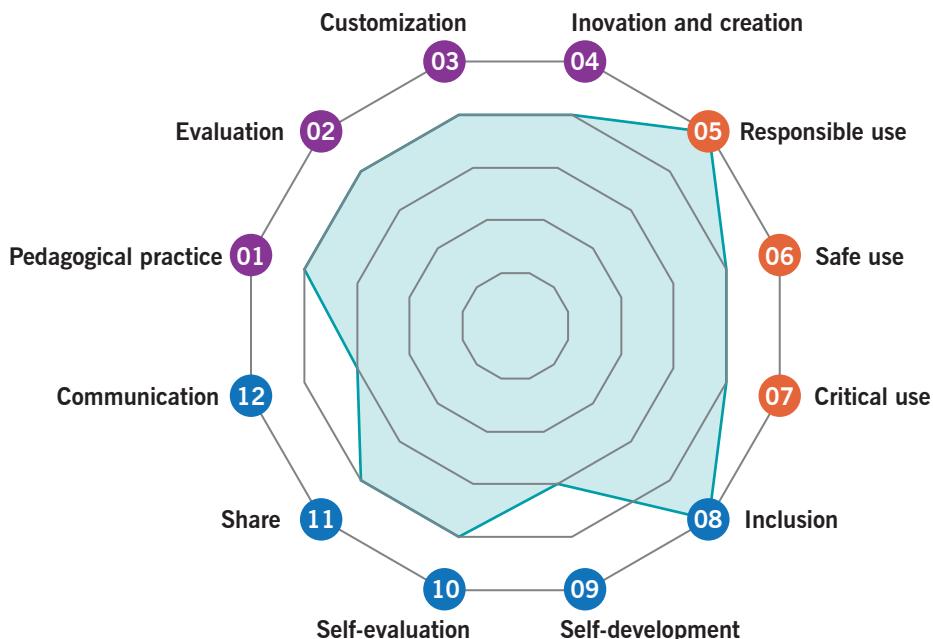
participation and dialogue. They are also able to maintain fluid communication with parents, informing them about their children's progress in the classroom and receiving the feedback (Levano *et al.*, 2019).

To improve this competence to level 5, teachers must be willing to use ICT actively and consistently in their teaching practice. They must also be willing to explore and experiment with new communication tools and platforms and be open to receiving training and education in this area (CBIE, 2023). Based on the above data, graph 1 shows that teachers have greater mastery and competences in digital citizenship (orange icon). Secondly, the selection of pedagogy (purple icon) is presented. Finally, is professional development (blue icon):

Finally, to fulfil the second objective of this study the digital competences most applied by UTM-CHS teaching staff during semester A-2023 are presented.

DISCUSSION

The results of this study revealed that the university professors of the Faculty of Humanistic and Social Sciences have advanced intermediate levels of digital competencies, with the area of digital citizenship being the most developed (Cejas *et al.*, 2019). The pedagogical area also showed good levels of digital integration, while professional development was the least developed competence. These findings suggest that efforts to improve digital competences of university teachers should focus on strengthening skills for self-directed professional development. University policies and professional training programs should provide more opportunities for faculty to continuously update their knowledge and adapt to new technologies. This may involve offering regular technology training workshops, creating online self-paced courses,



Graph 1. Graphical results of the 70 teachers about the area of pedagogy, professional development and digital citizenship.

and promoting participation in professional learning networks.

Digital teaching competences can be defined as necessary to prepare students for the digital world (Mertala, 2021). With regards to pedagogy, further development is needed in effectively incorporating technology into teaching practices, using it for customized student learning and collaborative work. University pedagogical models should evolve to leverage the affordances of digital tools. This requires rethinking course design, lesson planning, assessment methods and classroom dynamics in the digital age (Mendoza *et al.*, 2021). While digital citizenship showed high levels of adoption, ongoing guidance is needed on the ethical, safe and critical use of technology (Navarro *et al.*, 2022). As digital landscapes evolve rapidly, teachers must keep developing the competences to use technology responsibly, protect student data, and foster positive digital participation (Rodríguez *et al.*, 2021).

CONCLUSIONS

The results of this research allowed establishing that the digital competences related to digital citizenship were those that showed the highest levels of mastery by the teaching staff of UTM-CHS, reaching a value of 5. It was also found that competencies in pedagogy and professional development showed values close to 4, which demonstrates that there is a good level in these areas, although there is room for improvement. It is worth highlighting that 93% of participating teachers reported having received training in the use of ICT in education. However, their pedagogical and professional development competencies, as well as their research, educational technologies and intercultural skills, still need to be further strengthened. Likewise, leadership abilities require improvement.

The results allow concluding that Ecuadorian university faculty must deepen their digital aca-

demic training to successfully face the challenges of higher education in an increasingly digitalized context. It is also necessary for UTM to redouble its efforts to continuously train its teaching staff, to achieve the highest level in the three key areas evaluated, and thus guarantee quality learning environments for students. The researchers consider that teacher professional development should focus on strengthening teaching competencies. And that these, in turn, will be boosted if skills related to digital citizenship are promoted, a fundamental pillar today. Only in this way will they be able to train competent professionals who contribute to the country's development. These conclusions highlight the imperative need for constant updating and continuous commitment to the development of digital and pedagogical competences among university teaching staff to adapt effectively to the current educational environment and provide quality teaching in line with the demands of the 21st century. *a*

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